What is claimed is:

1. An apparatus for detecting a physical quantity to be detected; comprising:

a plurality of sensing units each sensing the physical quantity to output a voltage signal changing depending on the sensed physical quantity;

a plurality of processors each sampling and holding, at intervals, the voltage signal outputted by each of the sensing units; and

a controller controlling the plurality of processors so that the processors perform sampling operations at predetermined different timings shifted from each other.

2. The apparatus according to claim 1, wherein each of the plurality of sensing units is provided with a capacitive sensor element of which capacitance changes depending on the physical quantity to be detected and a capacitance-voltage converter converting a change in the capacitance of the sensor element to output the voltage signal, and

wherein the sensor elements of the plurality of sensing units are formed on the same substrate to form a single sensor.

3. The apparatus according to claim 2, wherein

each of the sensor elements has a first capacitor and a second capacitor electrically connected in series to each other, at least one of the first and second capacitors having a capacitance changing depending on the physical quantity to be detected and the first and second capacitors receiving first and second driving squire wave signals of which phases are opposite to each other, and

the capacitance-voltage converter has a circuit converting a difference between capacitance values of the first and second capacitors to the voltage signal, an input of the circuit being electrically connected to a joint point electrically connecting the first and second capacitors.

4. The apparatus according to claim 1, wherein the physical quantity is acceleration acting on the apparatus.

5. An apparatus for concurrently detecting a plurality of physical quantities to be detected; comprising:

a plurality of sensing units being formed on the same substrate to form a single sensor and each sensing each of the physical quantities to output a voltage signal changing depending on each of the sensed physical quantities;

a plurality of processors each sampling and holding, at a predetermined frequency, the voltage signal outputted by each of the sensing units to produce sampled and held voltage signals to be outputted from the apparatus as information indicative of the plurality of physical quantities to be detected; and

a controller controlling the plurality of processors so that the processors perform sampling operations at predetermined different phases shifted from each other during an interval defined by the predetermined frequency.

6. The apparatus according to claim 5, wherein each of the plurality of sensing units is provided with a capacitive sensor element of which capacitance changes depending on each of the physical quantities to be detected and a capacitance-voltage converter converting a change in the capacitance of the sensor element to output the voltage signal.

7. The apparatus according to claim 6, wherein the capacitive sensor element is provided with two fixed substrates and one movable substrate electrically connected to the capacitance-voltage converter, the three substrates being aligned in a detection axis in an order of one fixed electrode, the movable electrode, and the other fixed electrode to form two capacitors electrically connected in series, the first and second capacitors receiving first and second driving squire wave signals of which phases are opposite to each other, and the detection axis being set to detect one of the plurality of physical.

8. The apparatus according to claim 7, wherein the capacitance-voltage converter has a circuit converting a difference between capacitance values of the first and second capacitors to the

voltage signal, an input of the circuit being electrically connected to a joint point electrically connecting the first and second capacitors.

9. The apparatus according to claim 5, wherein the plurality of physical quantities are a plurality of types of acceleration generated in a plurality of directions set to the sensor.

10. The apparatus according to claim 5, wherein the plurality of types of acceleration are two types of acceleration generated in two different directions set to the sensor.

11. The apparatus according to claim 10, wherein the two different directions are two of three mutually orthogonal axis directions set to the sensor.